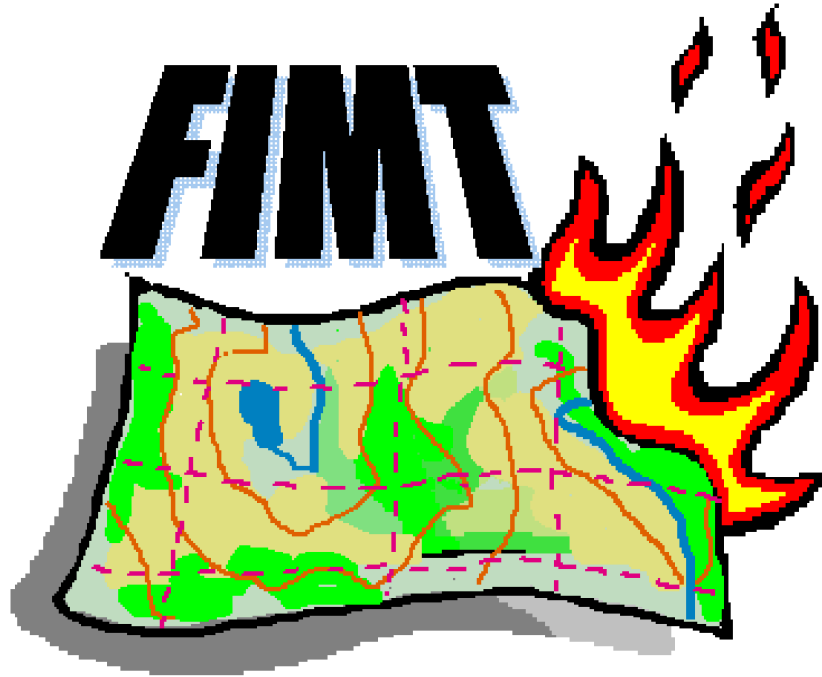# ArcGIS Application for Wildfire Incident Management
Version 9.2.0.2

User's Guide
Revised: July 2007

Developed by the USDA Forest Service
with input and guidance from the interagency wildland community.

Acknowledgements:

The Fire Incident Mapping Tool is greatly based on the Incident Command System (ICS). This method of managing a fire incident goes back decades. The standardized use of terms, processes, and symbols has been developed to operate, within a multitude of organizations and geographic regions, a standard of bringing personnel together and helping them operate efficiently.

This current ArcGIS extension is based on the California Department of Forestry's ArcView 3.x extension Ventura Tools and strives to simplify the data and the process by using ArcGIS and a personal geodatabase. Ventura County Fire Department started the idea of creating the extension and was successful in getting CDF to take on the project.

Appreciation goes out to the people involved in the development and testing of the software. It was a group effort between Canadian Alberta Fire Protection and many different state and federal agencies within the United States. The project could not have been completed without a tremendous amount of effort and collaboration. Also, we would like to thank Michael Rich, a contractor for Northrop Grumman IT working for the U.S. Forest Service, Pacific Northwest Region. Michael gave us the code for removing all unused symbols, which greatly assists the GIS specialist in creating a usable legend on the map.

In addition, thanks to the Rocky Mountain Region of the USDA Forest Service for starting this project and producing a program to make creation and management of fire incident data much easier and productive.

If you have any comments, suggestions, and/or recommendations, please contact one of the following:

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Introduction:

Welcome to the Fire Incident Mapping Tools for ArcGIS.

The purpose of the extension is to support wildland fire incidents. Data standards and symbology are extremely important due to the chance that many people from different locations and agencies could be using the maps and information. In 2006, the National Wildland Coordinating Group (NWCG) released GIS standards for standard operating guidelines. Within those guidelines were minimum data, map content, symbology, and export requirements. The FIMT tools meet those requirements.

This User's Guide was developed to describe how to utilize the Fire Incident Mapping Tools (FIMT) version 9.2.0.2 for ArcGIS 9.2. The document is divided into functional sections designed to instruct users in operating the fire mapping tools in ArcMap as they apply to the workflow typical at an Incident command. The best way to learn ArcMap and the fire mapping tools are to try them.

Fire Incident Mapping Tools for ArcGIS

The Fire Incident Mapping Tools is an ArcGIS extension. Access all extensions by choosing the "Tools" menu choice in the ArcMap user interface. Then choose "Extensions." Click in the box beside the extension which will place a check in the box and turn on any extensions (as shown below).
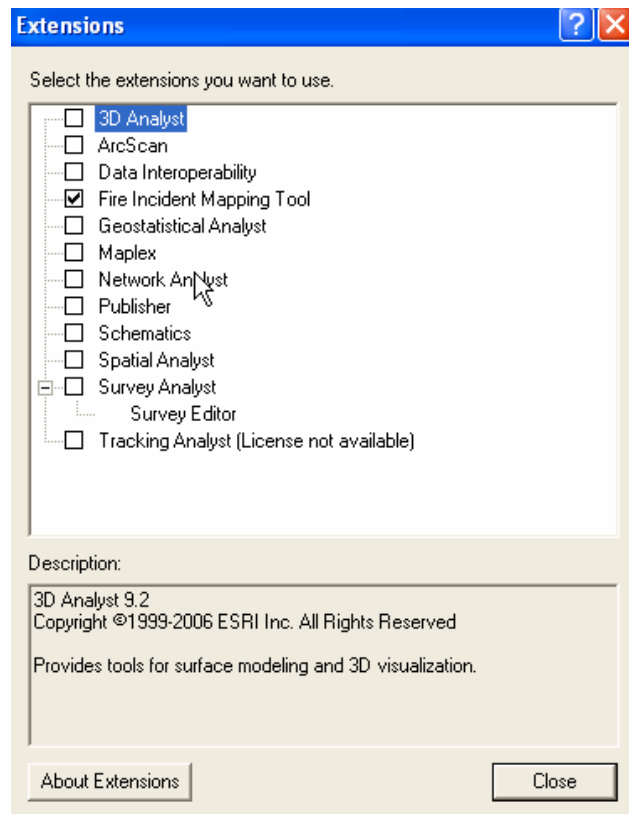
The FIMT tools are accessed through the FIMT toolbar, which is added to ArcMap using the Customize dialog. To add custom controls and toolbars:

1. Click the Tools menu and then click Customize.
2. Click the Toolbars tab if it is not already selected.
3. Click the check box to the left of the FIMT toolbar name.
4. Click Close.
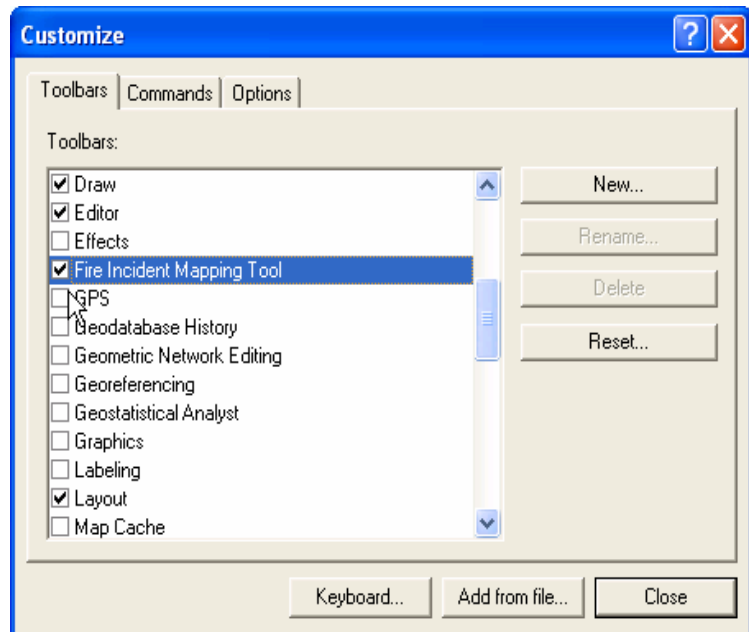
The FIMT toolbar is loaded into the ArcMap GUI (Graphical User Interface). The toolbar can be docked to the ArcMap GUI in any desired location.

(**Note**: *Editing is required and the Editor toolbar should be added if not already loaded.*)

The FIMT toolbar is composed of icons that represent both buttons and tools. For the purpose of this document, buttons perform an immediate task. Tools require interaction from the user either in the form of cursor control in the map view or in a popup dialog. The buttons contained on the FIMT toolbar are activated based on the current settings in the ArcMap document. The current editing environment, selected sets, and the entity type of selected features all affect which buttons are enabled.

(**Note**: *Each tool is finely described in Appendix I*).

The FIMT toolbar is divided into groups separated by vertical bars. The tools located in each group are described in Appendix I; the following sections describe a more functional use of the tools.

The first group is the Incident group. The tools in this group will affect the entire Incident geodatabase. Due to space, they have been set up as a pull down menu. Click on the "**FIMT ▼**" to get the menu to right.

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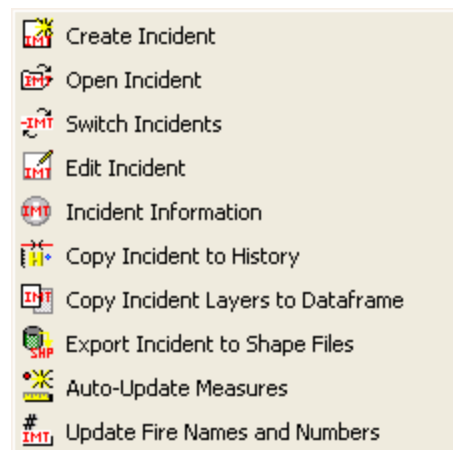
Incident Management and Information

As mentioned above, in the first group of tools, there are several tools that allow the user to manage the information contained in the Incident geodatabase. This management allows the user to tailor the FIMT map environment to support the local requirements of the incident and to support routine GIS tasks during the incident.

Creating a New Incident

Each Incident geodatabase created by the Fire Incident Management Tools is managed as a personal geodatabase (PGDB) or File Based geodatabase stored on the file system (See Appendix III for detailed information on the structure of the Incident PGDB). At the start of a new Incident, the user will create a new Incident and corresponding personal geodatabase.

To create a new Incident, click the **New Incident** button on the FIMT toolbar. A popup dialog allows the user to enter the information needed to create a new Incident.

The current release of the Fire Incident Mapping Tools (Version 9.2.0.2) supports the management of multiple Incidents from the same ArcMap document. Each Incident is contained in its own geodatabase and is accessed in ArcMap using a concept of an active Incident. Only one Incident can be active at a time and a tool is provided to switch active Incidents. The switch can only occur when there is no current editing session taking place. At the point one or more individual fire incidents converge into a single event, they can be combined into a single incident using standard editing tools. Tools for copying features from one or more sources into an Incident are available in the FIMT toolbar and are explained in Appendix I.

Each Incident consists of the following information:

Incident Name: The Incident (fire) name can consist of any text string and is usually already assigned to an Incident.

Unit_ID: Give the agency abbreviation that is managing the Incident.

Incident Number: The Incident number may be pre-assigned from the IMSR database located at NIFC in Boise, Idaho. However, most individuals will get this number from their dispatch center.

Magnetic Declination: Magnetic declination is sometimes referred to as magnetic variation or magnetic compass correction. It is the angle through which a magnetic compass bearing must be rotated in order to point to the true bearing or true north. The FIMT New Incident dialog contains web links to web pages

maintained for regions including the United States, Canada, and Australia[1]. The NOAA National Geophysical Data Center (NGDC) manages the United States web page. Users who have Internet access can use this link to web pages to determine the correct declination value for the Incident area. Otherwise, magnetic declination can be located on most standard map series.

Note: At this time, the magnetic declination is provided for reference purposes only; it does not affect the performance of the FIMT tools .

Coordinate Format: Each Incident has a default coordinate format that establishes how latitude/longitude values are displayed by the tools. The values can be changed at any time. The options include:

> **Decimal Degree** (*37.46842 N:: 107.71703 W*)
> **Degree Decimal Minutes** (*37 28.105 N:: 107 43.022 W*)
> **Degrees Minutes Seconds** (*37 28 6.33 N:: 107 43 1.30 W*)

Geodatabase: Each new Incident is written to a new geodatabase stored in the location selected by the user. Both Access and File based geodatabases are supported. Make a selection of which is the desired type.
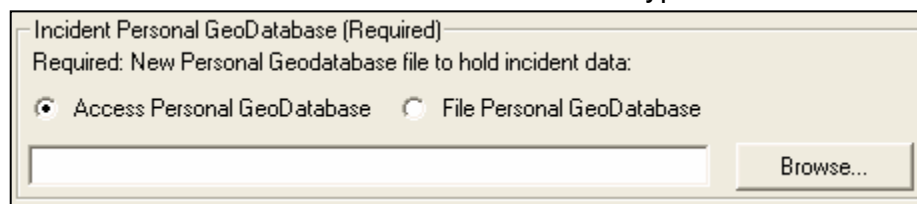
Use the browse button to select the path and type in the name of the PGDB to create.

Opening an Existing Incident

The user can open an existing Incident at any time. Since all of the information needed to manage an Incident is stored in the personal geodatabase, the FIMT tools can reestablish their own environment. Use the "**Open Incident**" button on the FIMT toolbar. Navigate to the Incident personal geodatabase to be open and then click Open on the browser dialog. The Incident grouped layers will be added to the map document. The selected Incident will be made the active Incident.

The FIMT tools allow the user to manage more than one Incident in an ArcMap document. The "**Open Incident**" button will add the selected Incident personal geodatabase to the existing map document along with any other Incident that was already opened. This also sets the current Incident designate to be edited.

The user can also open any existing ArcMap document (.MXD) that has the FIMT grouped layers in its table of contents without the need to use the "**Open FIMT Incident**" button. If the user has added other supporting feature classes, images, or tables to the map document, the user will want to save and reopen the ArcMap

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[1] Other regions can be added by inserting records to the "DeclinationSites" table in the template geodatabase. See Appendix II for details on the Incident PGDB data model.

document to maintain the reference to those layers. If there is a question of what Incident is set to be edited – use this button to display and check.

Switch Incidents

If the user has loaded more than one Incident into the current map document, the user can switch between active Incidents using the "**Switch Incident**" button. The "**Switch Incident**" button can only be used when there is no current edit session. If the user is editing features, the "**Switch Incident**" button will be disabled. Saving and stopping editing will reactivate the "**Switch Incident**" button.

Getting Incident Information

At any time during the use of the Fire Incident Mapping Tools, the user can access the Incident information entered when creating the Incident PGDB. The "**Incident Information**" button gives the user access to the Incident name, number, and other information. The dialog can also be used to modify some of the information if necessary.

Copy Incident to History

The "**Copy Incident to History**" tool opens a dialog that allows the user to select from FireLines, FirePerimeters, and FirePoints to snapshot into the history feature classes. Selecting the FirePerimeter option will actually snapshot FirePolygon, AssignmentBreaks, and PerimeterSector lines to their respective history feature class. FirePoints option will snapshot the AnnoPoints and the FirePoints to the History feature classes. Based on the frequency of change, the user and the Situation Unit Leader should decide how often historical snapshots should be made.

Moving Data to a New Data Frame

ArcMap supports the use of multiple data frames in an ArcMap document. Multiple data frames can be used to represent the Incident with different background source information. For example, the user may need to display both digital orthophotography (DOQ) and Digital Raster Graphics (USGS/FS single edition quadrangle maps) in the Incident maps. Rather than toggling between the two images in the ArcMap table of contents, the user can establish separate data frames for each image source.

The user creates a new data frame using the ArcMap Insert > Data Frame menu option. The user can select an existing data frame and make it active by right clicking on its name in the ArcMap table of contents and selecting Activate from the context menu. The "**Copy Incident Layers to Data Frame**" button adds the Incident group layers for the active Incident to the new (active) data frame. The user can now modify any map property in each data frame independently and thus have several alternate views of the Incident in the same map document. Each data frame can be added to a map layout to develop a variety of map products.

Export Incident to Shapefiles

Often there is a need to have shapefiles of the Incident features. This tool will prompt the user to navigate to directory and specifies the output directory where all of the exported feature classes will be stored. There is no control over the names of the output shapefile names since they are predetermined based on NWCG Standard GIS Operating Procedures (GSTOP) standards. All of the attribute items that belong to a geodatabase domain will be exported with both the domain code and description text as matching attribute columns.

Auto Update Measures

This command watches in the background and detects when a new feature is added or the shape of an existing feature is modified by any edit operation (not just the fire tools). The command operates as an environment setting and is either "on" (appears indented) or "off" (appears similar to other buttons). If the feature changes size, the automatically calculated size fields will be populated. It must be noted the size fields are calculated on taking the feature, reprojecting that feature into Albers Equal Area projection, and centering the feature in the center of the extent. There is extremely minimal distortion and probably the best representation of that feature. This will allow for standard conversions and little to no distortion. By default, this tool is enabled.

Update Fire Names and Numbers

This tool operates in the background controlling the population of the Fire Name and Number fields as well as other feature level metadata fields for all newly created fire features (fire point, fire lines, and fire perimeters). There are three setting options that control the population of the metadata fields. Clicking on the button opens a dialog that allows the user to control when and how the update of the metadata fields is populated. The user also has the option at any time to run a manual update of the fire name and number values.

Incident Utility Tools
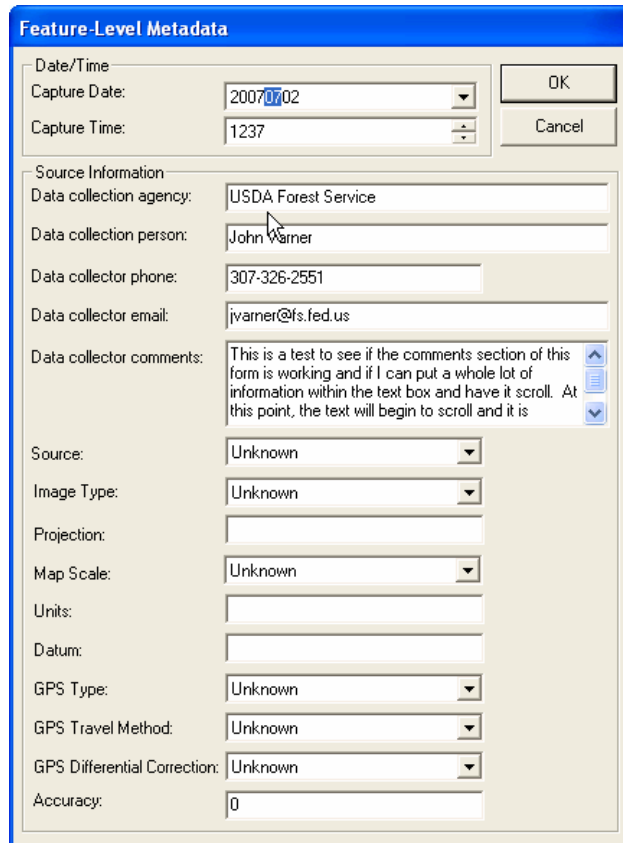
The second group of tools is designed for general use and not particularly working with a single feature class or Incident. Incident Utility tools either work as a stand alone tool or work for any selected features within the Incident geodatabase.

FIMT Feature Metadata

Feature level metadata is not a required item. However, it is helpful in situations where a rehab team is determining what areas to revisit. This button opens a form that allows the user to enter feature level metadata attributes for the selected features. Once the form is opened: all of the attribute fields that contain

a list of valid values appear with a pull down list on the form. The remaining fields are free form text fields. The user must know their local data standards to input the appropriate values.

Changing Symbology

There are several options for setting the map symbology used by the FIMT tools. Options include a toggle between standard color and standard black and white symbols, changing the size of point markers, lines, and text labels using a 10 percentage change in size, and changing between bold and normal text. Use the "**Incident Symbols**" button to modify the FIMT symbology. The Symbols and Labels dialog contains a checklist of layers that can be modified.

There is a **Remove Unused Symbols** button to reduce the number of symbols in the legend. This will remove all unused symbols in the Incident geodatabase. All other operations on the dialog will be operated on the selected set of layers. Buttons on the dialog control the sizing of symbols for lines, points, and text.

Symbol Color: can be changed using the buttons at the top of the dialog to switch between standardized color and black/white symbols. Switching between symbol colors will reset the symbology to the standard default values. Any customization of the FIMT layers performed by

the user will be lost. The color switch applies to all the layers in the active Incident; the checklist at the bottom of the dialog does not apply to the color switch.

Note: *If symbols are changed or removed, a quick way to reset them is to set the symbols to Black and White and then back to Color. This will read the layer files, resetting the original symbols.*

Labeling Incident Features

All of the Incident features can be labeled using the "**Label Multiple Fields**" tool on the FIMT toolbar. This tool includes a pull down list of all the FIMT feature classes and a series of check boxes next to each attribute item found in the selected feature class. Checking the radio button next to one or more attribute column(s) will add that column to the custom label properties for the selected feature class. A label string is constructed and added to the map display. The option to include the attribute column(s) name in the label string is also available. This is particularly useful for labeling PerimeterSector divisions and branches.
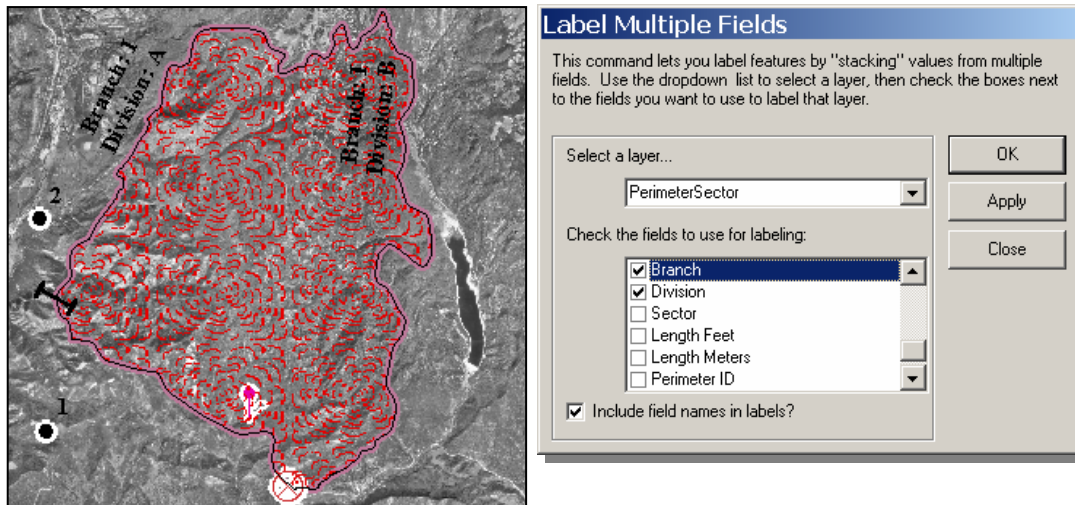
The "**Label Multiple Fields**" tool actually builds a label expression that can be accessed and edited using the feature class layer properties dialog under the "Label" tab.

Assigning to Unit

Use the "**Assign to Unit**" tool to attribute the line segments with the correct Zone, Branch, Division, and Sector attribute. The user should make certain that all features have been assigned the correct assignment value. During the Assignment break process, the user may inadvertently create an additional line segment between the last assignment break and the point where the original FirePolygon closed. By having the FireLines assigned to units, reports can be quickly produced to provide the Situation Unit Leader with the lengths of fire lines for each assignment.

Obtaining Latitude/Longitude

Latitude and longitude values are frequently used to reference locations on the ground during an Incident. The user will receive information from GPS data collection as well as manual map interpretation that the user will need to process into the Incident database. The user will also need to provide latitude/longitude values to personnel involved in the Incident. The Fire Incident Mapping Tools provide several functions for accessing and updating information based on latitude and longitude. See the section on Managing Data Elements, Point Locations for information on using latitude/longitude values to create and modify Incident point features.

The user can easily get latitude/longitude values from the Incident database by using the **Get Latitude/Longitude** button on the FIMT toolbar. The button returns latitude/longitude values for any location clicked in the map view. The format of the coordinate values returned can be represented in Decimal Degrees, Degrees Decimal Minutes, and Degrees Minutes Seconds. There is also a pair of radio buttons that toggles the datum of the returned coordinates between WGS84 (NAD83) and NAD27.
Note: *This will work at anytime, but will only return correct coordinate information when the data frame has a proper coordinate system defined.*

Managing Data Elements

The core function of the Fire Incident Mapping Tools is to provide the ability to create, modify, and display features of a wildfire incident. Features include FireLines, FirePoints, FirePolygons, AssignmentBreaks, PerimeterSector lines, AnnoPoints, and AnnoBreaks as well as tracking the history of features as they evolve over time. The following sections of this document outline the process for managing FIMT Incident features.

Editing an Incident

The tools used for managing data elements in the FIMT toolbar are activated only during an active edit session. Click on the "**Edit Incident**" button to begin editing. If data has been added to the ArcMap document from outside the Incident PGDB, the user must select the Incident PGDB as the target database. Once the user is in an active edit session, many of the tools on the FIMT toolbar become enabled. The user can also activate an editing session using ArcMap functions; the Editor toolbar must be added to the ArcMap GUI. From the Editor pull–down menu on the Editor Toolbar, click "Start Editing" to activate the editing environment.

Selected Set

In addition to activating the FIMT tools during an edit session, several of the FIMT tools are only enabled when there is a selected set of features from a particular feature class contained in the FIMT geodatabase. The user can use any standard ArcMap selection tool or method for creating a selected set.

Selectable Layer(s)

The Selection tab on the ArcMap Table of Contents (TOC) is turned on by default in ArcGIS version 9. The selectable layer(s) can be controlled from several locations on the ArcMap GUI. The menu option "Selection" > "Set Selectable Layers" opens a dialog that is used to select the features in each layer. This is very important when editing certain FIMT fire features, as the user will frequently be switching the selectable layers. If the Selection tab is turned off, click "Options" on the "Tools" menu to open the Options menu. On the Table of Contents tab, check the Selection box. This will add the "Selection" tab to the bottom of the Table of Contents.
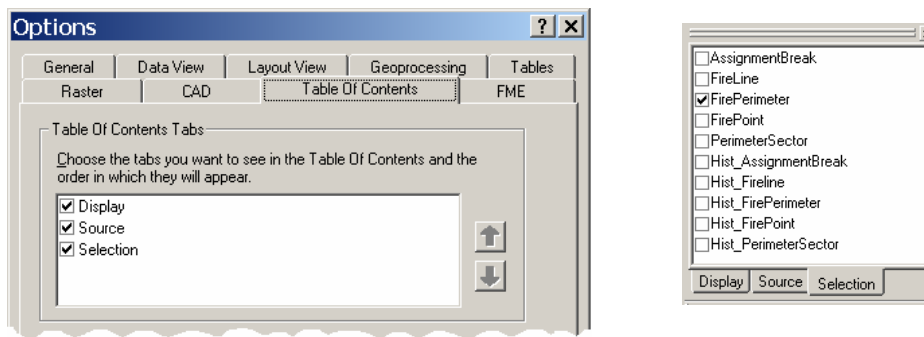
ArcMap Tip: *Remember to turn off the selection on all of the History feature classes.*

Deleting FireLine and FirePoint Features

During any ArcMap edit session, FireLine and FirePoint Incident features can easily be deleted using standard ArcMap functions. Select the features needed to delete and then click the Delete key on the keyboard.

Note: When deleting the FirePoints, remember the labels that have been copied to the AnnoPoint feature class will NOT be deleted. AnnoPoint features have to be managed separately (i.e. Labels are not feature linked).

Deleting Fire Perimeters

During the process of creating and maintaining an Incident database, it may be necessary to delete and replace the FirePolygon(s). The extension maintains a relationship between the FirePolygon, PerimeterSector, and AssignmentBreak feature classes. This relationship is also maintained during a delete operation. If a fire perimeter polygon is deleted, the FIMT tools will automatically delete the related objects. In the process of removing a fire perimeter, if the user needs to maintain the other objects, copy them to another feature class prior to deleting the fire polygon.

Note: The same is true for AnnoBreaks as above with AnnoPoints. They have to be managed separately.

ArcMap Tip: *The FIMT tools use a relationship between the FirePolygon ObjectID field and the PerimeterSector and AssignmentBreak feature classes PerimeterID fields. If there are a number of associated PerimeterSector and AssignmentBreak features, use this relationship to select all of the features for deletion. Prior to deleting a fire polygon, identify the ObjectID for the selected polygon(s) and then use this value to query the PerimeterSector and AssignmentBreak feature classes to select the associated features that also need deleting.*

FIMT Features

The FIMT geodatabase consists of two feature datasets each containing five feature classes. The following table shows the contents of the Incident geodatabase.

Feature Dataset	Feature Class	Geometry	Use
Incident	AnnoBreak	Annotation	Text features describing the fire assignments
Incident	AnnoPoint	Annotation	Text features describing the fire point features
Incident	AssignmentBreak	Point	Point location indicating changes in Sector, Division, Branch, and Zone
Incident	Fire Line	Line	Fire line locations
Incident	FirePolygon	Polygon	Actual fire perimeter polygons
Incident	Fire Point	Point	Misc. point locations
Incident	PerimeterSector	Line	Lines matching fire perimeter used to indicate changes in assignment for fire perimeter
History	Hist_AnnoBreak	Annotation	Text features for fire assignments snapshot by time/date
History	Hist_AnnoPoint	Annotation	Text features for fire points snapshot by time/date
History	Hist_AssignmentBreak	Point	Assignment break features snapshot by time/date
History	Hist_Fire Line	Line	Fire line features snapshot by time/date
History	Hist_FirePolygon	Polygon	Fire Perimeter(s) snapshot by time/date
History	Hist_Fire Point	Point	Fire point features snapshot by time/date
History	Hist_PerimeterSector	Line	Linear features used to indicate changes in assignment for fire perimeter features snapshot by time/date

Fire Perimeters

Fire perimeters are polygon features stored in the FirePolygon feature class. The FIMT tools maintain additional feature classes that store features needed to symbolize, label, and track portions of the fire and its boundary.

Perimeter Assignment Breaks (Sector, Division, Branch, and Zone)

Zone, Division, Branch, and Sector assignment breaks provide the administrative mechanism to divide the fire perimeter into separate, attributed line segments. Under normal operating procedures, this is a hierarchical system where Sectors are nested inside of Divisions and they are nested inside of Branches. Many

times Divisions and Branches are the only assignments used on an incident. Zones and Sectors are provided for those organizations that require the additional levels of the hierarchy. The FIMT tools allow the user to manage, Sectors, Divisions, Branches, and/or Zones through a line feature class named PerimeterSector and a point feature class named AssignmentBreak.

The geometry of the PerimeterSector line feature class is designed to automatically follow (snap to) the geometry of the FirePolygon feature. The FIMT tools performs feature snapping between the FirePolygon and the PerimeterSector feature classes when the fire polygon is edited. No editing of the shape of the lines in the PerimeterSector feature class should be performed. Any attempted reshaping of the PerimeterSector lines will be snapped back to follow the fire perimeter. The only direct editing of the PerimeterSector feature class allowed is splitting the lines into separate segments that can be attributed with their corresponding attribute values. The splitting of the PerimeterSector feature class is performed using the Split Assignment Line tool.

Update Perimeter Assignment Breaks
The AssignmentBreak point feature class has special symbology that indicates the change in assignment represented by special bracketed symbols. Point symbols are automatically generated based on the assignment attributes given to the lines in the PerimeterSector feature class. The symbology of the break points as well as updating any required changes in the geometry are updated using the "**Update Perimeter Assignment Breaks**" button. The following symbology is used based on the level of assignment break change in attributes.
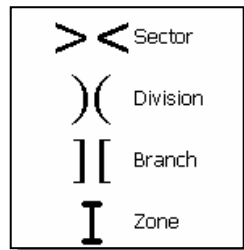
Creating a New Incident Perimeter

The user can create a fire perimeter using any methodology for data entry available in ArcMap. Methods may include heads up digitizing from a reference image, digitizing from paper source maps, importing data from GPS collection, and importing other coverages or shapefiles into ArcMap. Polygons are copied into the FirePolygon feature class using the "**Copy to Perimeter Layer**" button. The FirePolygon feature class is populated and attributed using tools in the FIMT toolbar. When creating a fire perimeter in a new Incident PGDB there are several steps that must be followed:

Step 1A – "Copy to Perimeter layer"
(Using existing polygons): Use the button to move any set of selected polygons into the FirePolygon feature class. If this is a new (empty) Incident PGDB, the FirePolygon feature class will be empty. During the copy to perimeter

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process, both the FirePolygon feature class will be populated and the matching lines in the PerimeterSector feature class will also be created.

Step 1B – (Using existing polylines in ArcInfo or ArcEditor): The user can create a FirePolygon from line segments that connect or cross to form a closed area. This process is only available with **ArcEditor** and **ArcInfo** licenses (*ArcView licensed users can use the Trace tool to trace linear features to create a polygon*). Use the Topology toolbar to access the "Construct Features" tool. This step also requires the use of a target scratch polygon feature class to receive the constructed polygon. *NOTE: Do not use the actual FirePolygon feature class for the target feature class when using the Construct Features tool; create the polygon into a scratch feature class before it can be copied into the FirePolygon feature class.*

1. Make sure the Topology tool bar is added to the ArcMap GUI.
2. Select the existing line segments that form a closed polygon from any available source.
3. Set the Target Feature class on the Editor Toolbar to the scratch polygon feature class.
4. Set the edit task to "Create New Feature."
5. Click the "Construct Features" tool on the topology toolbar, accept the default cluster tolerance, and click "OK." This will create a new polygon in the scratch polygon feature class.
6. Set the selectable layers to include the scratch polygon feature class, and then select the newly created polygon.
7. Click the "**Copy to Fire Perimeter**" button to copy the new polygon into the FirePolygon feature class. This will also create the corresponding polylines in the PerimeterSector feature class.

Step 1C – (Using existing polylines in ArcView): The user cannot create a FirePolygon from line segments that connect or cross to form a closed area when using an ArcView ArcGIS license. The topology toolbar "Create features" tool is disabled with an ArcView license. However, use the ArcGIS Trace tool to trace selected lines that close to form a polygon area. The FirePolygon feature class should not be used as the target feature class for creating the polygon. The user should create a scratch polygon feature class in the Incident PGDB that can be used to capture the new polygon. The following steps can be used to create a fire perimeter polygon by tracing existing line segments. Note: This process is described in detail in the section: "*Tutorial: Adding a Fire Perimeter- Advanced Editing*".

1. Set the selectable layer to the source of the lines being traced.
2. Select all the line segments that need to traced.
3. Set the Target on the Editor Toolbar to a scratch polygon feature class and set the Task to Create New Feature.
4. Select the Trace tool from the Editor Toolbar.
5. Click in any location on the selected line segments and begin tracing.

6. Trace along the first line segment until an intersection is reached with another selected line or the endpoint of the line currently being traced is reached.
7. Left Click (once) to stop tracing at the intersection, then Left Click again in a location in the next line segment to trace. This stops tracing of one line segment and begins tracing again on the next segment.
8. Continue until the entire area has been traced, then Double Click to end the trace process, and complete the closed polygon.

Step 1D - Creating polygon from no existing vector source:
Use the "**Create Fire Perimeter**" tool to manually draw any new fire perimeters using any source of information available. Make note that when this tool is selected, the edit task is automatically set to "Create Fire Perimeter" and the target feature class is set to the FirePolygon feature class.

The remaining steps outline the process for completing a new fire polygon and adding the attributes and assignment breaks.

Step 2: **Creating Assignment Break geometry**:
Once a FirePolygon is created, all of the associated assignment values (Sector, Division, Branch, and Zone) contained in the PerimeterSector feature class will be set to "Unassigned." The line segment representing the fire polygon assignments in the PerimeterSector feature class will consist of a single line that closes to match the fire polygon. If the new FirePolygon will be associated with more than one assignment break, first split the PerimeterSector line at the appropriate locations.

Step 2a: Split Assignment Line
Use the "**Split Assignment Line**" tool on the FIMT toolbar to perform this task. Split the PerimeterSector line at each location that corresponds to the administrative assignment of Zone, Branch, Division, and Sector. The "**Split Assignment Tool**" will re-draw the split PerimeterSector line segments with a temporary graphic displaying each side of the split in **blue** and **green** colors. A dialog is them presented that allows the user to set the assignment attributes to each side of the split. (**Note:** C*ategories are all optional; the Zone and Sector values will remain unassigned if they are not used on the Incident*).

ArcMap Tip: *Do **not** use the ArcMap "Merge" tool to un-split PerimeterSector lines, as this will create unpredictable results. Use the ArcMap "Split Tool" to split a PerimeterSector tool, however; to manually set the Unit assignment use the Assign to Unit tool.*

Step 2b: Floating Assignment Break
Occasionally an AssignmentBreak is needed outside the perimeter of the fire. In this case, the user can use this tool to create a new feature in the AssigmentBreak feature class. The user will set the "BreakType" field to the type of assignment desired and the angle needed.

ArcMap Tip: *Some users who do not want to manage the perimeter of the fire will only use the Floating Assignment Break tool to place their assignment symbols. By doing this, the Perimeter Report and the FireLine Report will not be correct.*

Step 3: Assigning to Unit:
Use the "**Assign to Unit"** tool to attribute the line segments with the correct Zone, Branch, Division, and Sector label. Make certain that all lines have been assigned the correct assignment values. During the Assignment break process, the user may inadvertently create an additional line segment between the last assignment break and the point where the original FirePolygon closed.

Step 4: **Update Perimeter Assignment Breaks**:
Use the "**Update Perimeter Assignment Breaks**" button to generate AssignmentBreak point symbols at the connection point between multiple PerimeterSector lines. This tool will insert the appropriate point symbol into the AssignmentBreak point feature class. The tool will automatically merge all connecting PerimeterSector lines that have identical assignment attributes.

Merging/Splitting Assignment Breaks

The assignment breaks in the PerimeterSector feature class can be modified at any time. New assignments can be created and removed by updating the assignment attributes for the lines requiring modification.

Removing Assignment Breaks: Update the associated attribute values for Zone, Branch, Division, and Sector in the PerimeterSector Feature class. Then, if needed, use the "**Update Perimeter Assignment Breaks**" button to remove Assignment breaks if the attribute values in the PerimeterSector feature class are the same on both sides of the Assignment break.

Create Assignment Breaks: Use the "**Split Assignment Line**" tool to split a selected PerimeterSector line in the location of the new Assignment break. Then, if needed, use the "**Assign to Unit**" button to assign different Assignment break attributes to the lines on each side of the split. The "**Update Perimeter Assignment Breaks**" button then may be necessary to update the Assignment breaks and create the new point feature at the location of the split.

Fire Lines

Fire Lines are used to represent a variety of linear features in the Incident personal geodatabase. There are 18 fire line types that are maintained in a coded value domain in the Incident PGDB (See Appendix III for a diagram representing the fire line domain).

Creating

Fire lines can be created using several methods. Data input can include heads-up digitizing from a raster backdrop (DOQ, DRG) or by moving selected features from another data source into the Fire Line feature class.

Create Fire Lines:
This tool allows the user to draw directly into the FireLines feature class using the mouse. The tool prompts the user for fire line attributes once a fire line is entered. Using the standard "Create Feature" process in ArcMap will not prompt for fire line attributes and should be avoided to eliminate the possibility of missed attributes (and display).

Vertices along a line are entered using the left mouse button. The user can control existing vertices along a line by clicking the right mouse button while the cursor is positioned over a vertex. Additional coordinate input methods may be access and other vertex commands using the right mouse button while the cursor is positioned away from existing vertices. Complete (Finish Sketch) the line by double-clicking the left mouse button. Once the line input is complete, a popup dialog is displayed that allows the desired fire line type and Assignment designation to be specified.

Copy to Fire Lines:
This tool allows the user to copy any selected linear feature(s) from any source into the Fire Line feature class. The user will frequently receive input in the form of shapefiles or coverages that have been collected using a variety of different processes. Any line source can be used to input data into FireLine feature class. The copied lines will not be attributed and will default to an Unknown fire line type. After using the **"Copy to Fire Lines"** tool, set the fire line type and unit assignment appropriately. If Firelines are imported from another Incident PGDB or have any fields in common with the FireLine feature class, fire line attributes will also be imported.

Modifying Fire Line Geometry

The user will frequently be required to update or modify FIMT features based on the condition of the incident and operations that are taking place daily on the ground. Several FIMT tools support modification tasks.

Split Fire Lines:
This tool allows the user to split a single line into two parts. The "**Split Fire Lines"** tool changes the cursor to a knife icon that is used to draw a line across a single existing fire line. The crossed line is divided into two parts. A dialog is opened that allows the user to set the line type for both parts of the split line segment. Only a single line segment can be split during a single split operation. Drawing across multiple line segments will produce an error message.

Join Fire Lines:

This tool allows two separate line segments to merge into a single line. The two lines must be selected and the end points must be connected (coincident). Use the standard ArcMap tools to select the features to joined. Clicking the "**Join Fire Lines**" tool will open a dialog that allows selection of the line type to the single line segment created from the two selected fire lines.

Modify Fire Line Attributes:

During the lifespan of the Incident database, the user will periodically need to change the line type designation for the fire lines. This operation is accomplished using the "**Change Fire Line Type**" tool. Any ArcMap selection method may be used to select a single fire line. Clicking the "**Change Fire Line Type**" button will activate the dialog that allows the selection of the fire line type and to assign some feature attributes to the line.

Point Locations

Point locations are used to indicate single point locations on the ground. The FIMT tools provide ability to add, modify, attribute and label point features. The points are stored in the FirePoint feature class in the Incident PGDB.

Creating

Point locations can be added from several sources including heads up digitizing using a reference image, digitized from paper maps, input from a GPS device, other source coverages and shapefiles, or added using latitude/longitude values. The add point function in the FIMT tools provides a dialog for setting the point type and specific information such as Name and Date. The spot fire point type also includes a field to indicate the direction of spread.

Create New Fire Point:

This tool adds point locations to the FirePoint feature class based on user input. Simply click on the location for the new point feature. A dropdown list is displayed containing valid point types. Additional attribute input boxes will change based on the point type selected.

Create New Fire Point Latitude/Longitude Coordinate Input:

This tool adds point locations to the FirePoint feature class based on the latitude/longitude values entered by the user. The input dialog accepts coordinate values in Decimal Degrees, Degree Decimal Minutes, and Degrees Minutes Seconds. After entering a coordinate, a dropdown list is displayed containing valid point types. Additional attribute input boxes will change based on the point type selected.

Modifying

Move Fire Point: Latitude/Longitude Coordinate

Point feature attributes and location (x/y coordinates) can be modified using the FIMT tools. Points can be selected and moved using the ArcMap Edit tool to drag and drop features in the map view. Entering a new latitude/longitude value using the "**Move Fire Point: Latitude/Longitude Coordinate**" Input tool can also be used to modify point locations. Use this tool to move a selected point to a new location based on known latitude/longitude values. The tool accepts coordinate input in Decimal Degrees, Degree Decimal Minutes, and Degrees Minutes Seconds. **Note:** *The existing location will be displayed when the tool is used.*

Importing from Other Sources

Copy Features to Fire Points

Any valid point data source may be used to input points into the FirePoint feature class. Use the "**Copy Features to Fire Points**" button to copy the selected set of points into the FirePoint feature class. The selected points will be copied to the FirePoint feature class and given the unknown point type. After a set of selected points are moved into the FirePoint feature class, set the point type using the "**Change Point Information**" tool.

Changing Point Types

The point type and corresponding additional attribute values of a single selected point in the FirePoint feature class can be changed using the "**Change Point Information**" button. A dialog will open that contains a list of valid FirePoint types and their associated attributes.

Populate Fire Point Coordinate Table

Often, users need to display the coordinates of the FirePoints in different formats and coordinate values. This tool will populate a table with the FirePoint feature names and some of the standard coordinate formats used on fires. The tables will show the X and Y values of the projection being used, decimal degrees, decimal minutes, decimal minutes seconds, US National Grid, and the US Military Grid.

The user can load the table, go into the properties of the FirePoint Coordinate table, and turn off the formats that are not desired. This will give the ability to quickly place the table on a layout. This is done by having the layout open, then clicking in the "Options" button in the table window, and selecting "Place table in layout."

Incident History

One of the most significant features contained in the FIMT tools and the Incident PGDB is the ability to create snapshots of the current Incident information and

store it into history layers. There are five history feature classes contained in the Incident PGDB that match the feature classes in the Incident feature data set. These include Hist_AssignmentBreak, Hist_FireLine, Hist_FirePolygon, Hist_FirePoint, and Hist_PerimeterSector.

All of the features that are copied to the history feature classes are attributed with a date and time stamp (SnapShot fields). This attribute allows any number of uses that require information about the condition of the Incident at a particular time. During an incident command, the GIS staff editing an Incident database should make periodic copies to the history feature classes. This should be done at least once per day.

Moving Incident Elements to History Layers

Copy to History
The "**Copy to History**" tool opens a dialog that allows selection of FireLines, FirePerimeters, and FirePoints to snapshot into the history feature classes. Selecting the FirePerimeter option will actually snapshot FirePolygon, AssignmentBreaks, and PerimeterSector lines to their respective history feature class. Based on the frequency of change, the user and the Situation Unit Leader should decide how often historical snapshots should be made.

Generating Reports

FireLine, FirePerimeter, and FirePerimeter change reports can be generated based on the assignment attributes on the PerimeterSector lines and the FireLine feature classes. The reporting tools in the FIMT toolbar contain the function that copies the contents of the report to the Windows clipboard. Use the paste function to add the report text to any text editor/word processor, or paste the report text into the ArcMap layout view.

Fire Line Report

The FireLine report contains a summary of each fire line type by feet, meters, miles, kilometers, and chains.

Perimeter Report

The perimeter report summarizes the FirePerimeter and FireLine features by assignment. This report gives a complete list of all line types by assignment.

Perimeter Change Report

The perimeter change report uses the information saved in the Hist_FirePolygon feature class to produce a report of perimeter area changes over the lifespan of the incident. For each date in the polygon history, a record will be reported showing the actual area and the change in area.

Output to Text Editor

The copy button on the popup report dialog box utilizes the Windows clipboard to store the text from either a perimeter or Fire Line report. The user can paste the copied text into any text editor that supports Windows cut and paste functions.

Appendix:

Appendix I: Tool Usage

Group 1.   Incident Tools
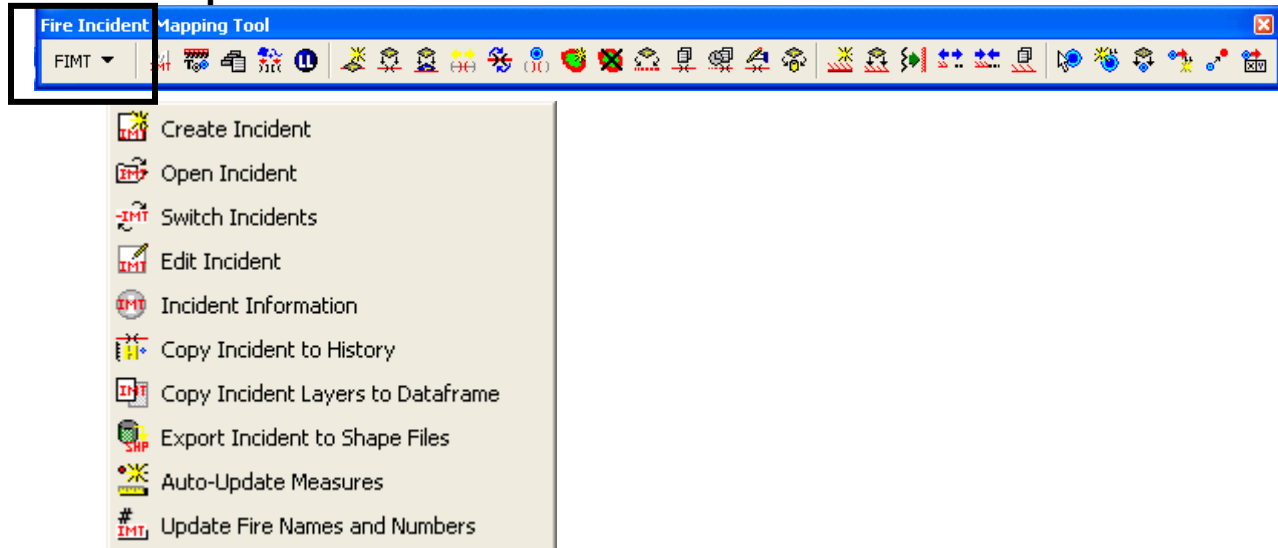
The Incident tools are now a pull down menu. This shortened the menu and left the general editing tools up while hiding the less used tools until needed. Some of these tools were part of the Utility Tools, but were used less frequently. Below are descriptions of how each tool works.

Create Incident

This tool creates a completely new FIMT Incident and its corresponding Geodatabase. This Geodatabase will contain all of the required feature classes using the projection that is selected for the Incident.

Much of the information included will be used to complete feature level metadata automatically. When this button is clicked, the following dialog will be displayed:

New Incident

Incident Identification (Required)

Incident Name (up to 40 Chars.):

ICS System Unit ID (up to 7 Chars.):

Fire Number (up to 8 Chars):

OK

Cancel

Metadata (Optional/Suggested)

Agency in control of fire:

Name of data entry person:

Permanent phone number:

Permanent email:

Data entry comments:

Magnetic Declination (Decimal Degrees): 0

Go to Magnetic Declination Calculator Web site for: United States   Go...
(Also sets English or Metric units for some features)

Coordinate System (Required)

Preferred Lat/Lon Coordinate Format:

Incident Spatial Reference: Select or set Spatial Reference...

Unknown

Incident Personal GeoDatabase (Required)
Required: New Personal Geodatabase file to hold incident data:

⦿ Access Personal GeoDatabase   ○ File Personal GeoDatabase

Browse...

The user is prompted for the primary Incident fire labeling information and this starts with the "Incident_Name" field. The other information in the first block ("Unit_ID" and "Fire Number") is also required. There may be several reasons for this information to change, but the application will allow for these changes at any time.

The next block of information is metadata. The Incident will have this information and if the user does not turn off the settings, all metadata information will be placed on each feature as it is created. All of these fields are optional.

AI-2

The next block is for setting the projections, datum, and with that, the spatial reference for the geodatabase. By clicking in the Select or set Spatial Reference button, the user will be prompted to navigate the ESRI spatial reference windows browser. Next, the user will select what default format they would like to have the Lat/Long tool display. This format can be changed at any time.

The last block is for saving the geodatabase. Choose the geodatabase format desired to store the data, specify the name of the new FIMT database, and where it should be stored using the Browse button next to the geodatabase name field.

Click OK and the new Incident database will be created. The standard FIMT Incident layers will be created in this database and loaded into the current data frame automatically.

Open Incident

This tool lets the user browse the file system and open a geodatabase that contains Incident data. Simply select the appropriate geodatabase, and the application will load the FIMT layers it contains into the current data frame automatically, and work may now begin with the FIMT tools. Both Access and file based geodatabases are supported.

If an Incident is loaded into a document that already has layers in the map, such as background layers or images, the Incident layers will be added to those in the active data frame.

If one Incident has been loaded into the document then another is loaded, the second Incident becomes the active Incident. Any editing done with the FIMT tools will apply only to the second Incident.

If the map document already contains the layers for an Incident, opening the Incident a second time will not create another set of layers. The newly opened Incident will become the active Incident, and editing done with the FIMT tools will apply. The FIMT tools will use the existing layers from that Incident.

Switch Incident

This tool allows the user to switch from one Incident to another when more than one Incident has been loaded into the current ArcMap document. The button is only active when editing is not taking place. The user cannot switch to a different Incident during an active edit session. To switch to a different Incident save the current edits (if appropriate) and then stop editing. A dialog will appear listing all FIMT

Incident geodatabases loaded into the current ArcMap document. Click on the desired Incident and click the OK button.

Edit Incident

This tool starts an ArcMap Edit session for the active Incident. The user can verify the active Incident by using the Incident Information button described above. This tool performs the same task as selecting "Editor" > "Start Editing" from the standard ArcMap Editor Tool bar. To stop editing, select "Stop Editing" from the Editor menu on the Editor Tool bar.

Incident Information

This button displays the FIMT Incident information dialog (the same dialog that was used to create the Incident), but only some of the fields can be modified (dialog can be seen on AI-2).

The user can change the "Fire_Name," "Unit_ID," "Fire_Number," metadata fields, "Magnetic Declination," Coordinate web page location, and the default Lat/Long coordinate format, but cannot change the spatial reference or the geodatabase file.

Copy to History

This button saves a snapshot of the current fire layer features into the history layers contained in the Incident geodatabase. Use this tool to preserve a record of the Incident including fire lines, fire perimeters, and fire points at a particular position in time. It will also allow for the use of the Draw History tool and the Perimeter Change Report.

The button is enabled when editing the Incident geodatabase, and the perimeter layers are present in the active data frame. When the user clicks the button, specify the desired date, and time to be recorded with the fire perimeter. The current date and time are filled in by default:

A date and time stamp is recorded in the history feature classes called SnapShot fields. The values can be used to query the history layers, which allows viewing of previous versions of the fire perimeter or other fire layers.

Copy Incident Layers to Data Frame

There may be times when the user wants to have several data frames containing the FIMT Incident layers. For example, Incident layers displayed over two different sets of background images. Or, one data frame that contains an overview of the entire fire area, and another that is zoomed in on a particular location. This tool allows the Incident layers to be copied into the current data frame.

Create a new data frame, using the Insert > Data Frame menu option. Or, select an existing data frame and make it active by right clicking on its name in the table of contents, and selecting Activate from the context menu.

Click the **Copy FIMT Layers to Data Frame** button. The Incident layers will be added to the active data frame.

Export to Shapefile

This tool creates a set of shapefiles from the active Incident database. The user specifies the output directory where the files will be written. Because output shapefile names meet NWCG GSTOP standards, the user has no control over the format of the names. All of the attribute items that belong to a geodatabase domain will be exported with both the domain code and description text as matching attribute columns.

Auto Update Measures

This command watches in the background and detects when a new feature is added or the shape of an existing feature is modified by any edit operation (not just the FIMT tools). The command operates as an environment setting and is either "on" (appears indented) or "off" (appears similar to other buttons). The command scans for certain fields on features, and if it finds one of more of the fields, it populates it with a specific measurement calculated from the feature's shape. The following table lists the fields to be updated and the measurements that are calculated:

Field Name	Applies to	Contents
AutoXCoord	Points only	X-coordinate of point features, in the spatial reference of their GDB.
AutoYCoord	Points only	Y-coordinate of point features, in the spatial reference of their GDB
AutoLatitude	Points only	Point feature latitude, calculated by projecting point if necessary. Datum is WGS84
AutoLongitude	Points only	Point feature longitude, calculated by projecting point if necessary. Datum is WGS84
AutoFeet	Lines and Polygons	Length of line or perimeter of polygon in feet. Calculated by projecting feature to localized equal area projection.
AutoMeters	Lines and Polygons	Length of line or perimeter of polygon, in meters. Calculated by projecting feature to localized equal area projection.
AutoAcres	Polygons	Area of polygon feature in acres; calculated by projecting feature to localized equal area projection.
AutoHectares	Polygons	Area of polygon feature in hectares; calculated by projecting to localized equal area projection.

To calculate lengths and areas, the tool constructs a localized equal-area projection using the center of the feature's envelope as the projection origin. The tool then projects the feature into that coordinate system on-the-fly and obtains the necessary measurements. This process ensures consistent values regardless of the source projection. The process returns accurate measurements, but because the shapes are projected out of their native coordinate system, the returned measurements will not match exactly the values a user would receive if they take the shape out of the database and calculate its area, length, or perimeter.

The tool will calculate these values for any features (not just FIMT fire features) that have the fields that correspond with the feature's geometry type, as listed above. It will calculate values for a subset of the fields if they are not all present on a particular feature (e.g. if the perimeter length fields are missing from a polygon feature, it will still calculate the areas).

When the tool button is "pressed in," the tool is monitoring feature changes and automatically calculating the measurements. When the tool is not "pressed in," the tool is ignoring all feature changes and will not update measurements. When it is reactivated, it will not go back and recalculate measures for features that were modified while it was inactive. Users should leave the tool turned on all the time if they are working on a fire incident, since the reports generated by the fire tools use these fields to report lengths and areas. Users can turn the tool off if they are doing non-fire Incident work. A small performance

increase while editing may be observed when the tool is turned off; however, performance should not be a determining factor when using the tool.

Update Fire Names and Numbers

This command button operates in the background controlling the population of the feature level metadata fields for all newly created fire features (FirePoints, FireLines, and FirePolygons). There are three setting options that control the automatic update of the metadata fields. Clicking on the button opens the following dialog:
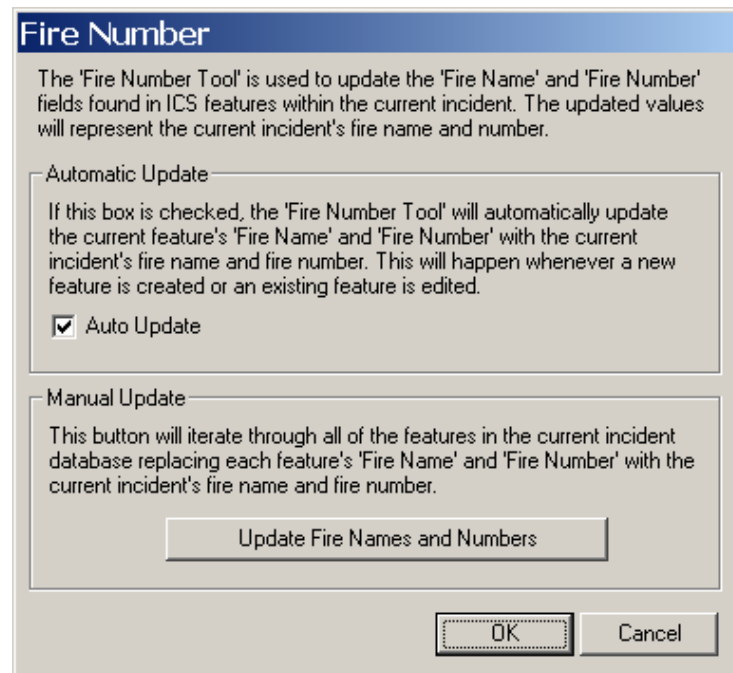
The tool allows turning the Auto update "on" or "off." The automatic update could affect performance during certain processes; therefore, the user has the option to turn off the Auto Update feature. At any time, the user also has the option to run a manual update of the Fire Name, Fire Number, and metadata values.

Group 2. Utility Functions

FIMT Feature Metadata

> This button opens a form that allows the user to enter feature level
> metadata attributes for the selected features. When opened, the
> following form is displayed:

> All of the attribute fields that contain a list of valid values appear
> with a pull down list on the form. The remaining fields are free form
> text fields. The user must know local data standards to input the
> appropriate values.

Change FIMT Symbol Properties

> This button brings up a dialog that allows the user to set overall
> properties of the symbols used for mapping Incident data. The dialog
> contains two buttons that switch between color and black/white
> symbol sets. The symbol color settings will always reset symbol

properties to the default values for either color choice. All user defined customizations to layer symbol properties will be lost if the color choice is switched.

Symbols and Labels

This command lets you reset the symbology and classifications for the FIMT layers to their defaults, or change symbol properties on a layer-by-layer basis.

Reset ICS fire incident symbols to:

| Standard Color Symbols | Standard Black & White Symbols |

Warning: This will restore the symbol sizes, colors, and classifications to their defaults.

Change these layers:

☑ AssignmentBreak
☑ Hist_AssignmentBreak
☑ FireLine
☑ Hist_Fireline
☑ FirePolygon
☑ Hist_FirePolygon
☑ FirePoint
☑ Hist_FirePoint
☑ PerimeterSector

Make markers 10%:	Larger	Smaller
Make lines 10%:	Wider	Narrower
Make labels 10%:	Larger	Smaller
Make text style:	Bold	Normal

| Select All | Clear All | | Remove Unused Symbols |

| Close |

The dialog also controls resizing marker, line, and label sizes by 10% increments (larger or smaller). Text labels can also be toggled between bold and normal text. To control symbol size properties:

1. Select the appropriate check box to indicate which layer(s) are to be changed.
2. Use the "Select All" button to select all of the Incident layers, or the "Clear All" button to clear all Incident layers from the list of layers to modify.
3. Use the "Larger" or "Smaller" buttons to the left of "*Make markers 10%:*" text on the form to increment the point marker symbols for the selected layers.
4. Use the "Larger" or "Smaller" buttons to the left of "*Make lines 10%:*" text on the form to increment the line symbol width for the selected layers.
5. Use the "Larger" or "Smaller" buttons to the left of "*Make labels 10%:*" text on the form to increment the size of text labels for the selected layers.
6. Use the "Bold" or "Normal" buttons to the left of "*Make text style:*" text on the form to switch text labels between bold and normal text.
7. Click "Close" to close the dialog. **Note**: Changes made using the form are applied immediately and can be undone by applying the opposite operation.

Please note the new button near the bottom right: "Remove Unused Symbols." This tool will go through the Incident features and remove all unused symbols from the table of contents. Generally, this is used just prior to developing the map layout. Once a legend has been placed on the map and the map completed and printed, go back in and choose either the Color or Black & White symbols buttons on the top of the dialog to reset the symbols again. Note: if this last part is not done and a new feature type is input, the new feature will not display on the screen.

Label Multiple Attributes
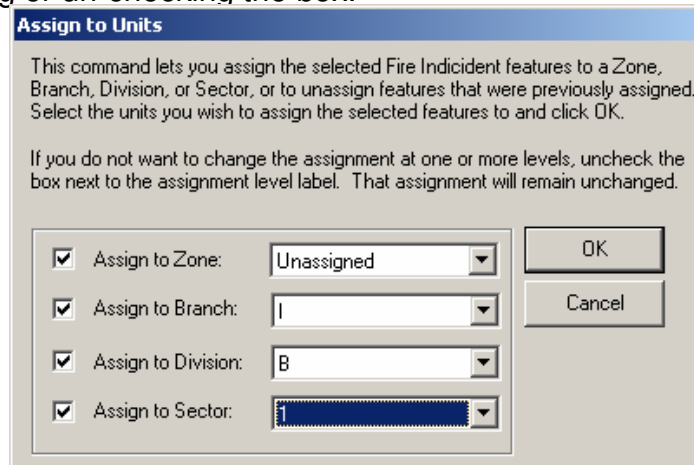
This command allows users to create simple "stacked" labels using any number of fields in an FIMT feature class. It works directly on the label properties of the feature layer, so the user can go into the labels dialog and further modify the label format if they wish. The button pops up a form containing the following features:

1. Select the layer from the dropdown list of layers in the current ArcMap document.
2. Check the desired fields from the provided list. Each field selected will be a separate line in the stack.
3. Check the box to include field names in the labels. Leave blank to exclude field names in the labels. If the box is checked, the labels will look like "Fieldname = Value." If it is not checked, only the values will be shown.
4. Click OK to keep the settings and close the form. This is used to modify just one feature class.
5. Click the Apply button to create the labels for the selected feature class, which leaves the form open. This is used to set up labels for another feature class.
6. Click the Cancel button to close the form without applying the current settings. Any settings applied with the Apply button will still be in effect and will not be undone by the Cancel button.

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Assign to Unit

This command button displays a form that lets the user assign the selected features to any combination of Zone, Branch, Division, or Sector. The form allows the user to control which level is affected by checking or un-checking the box.

The form contains a series of check boxes and dropdown lists. Each pair represents a "level" assigned to the feature(s), (i.e. Zone, Branch, Division, and/or Sector). Check the box for a particular level to change the assignment for the selected feature(s). Select the assignment from the corresponding dropdown list. Un-check the box to change the assignments at that level.
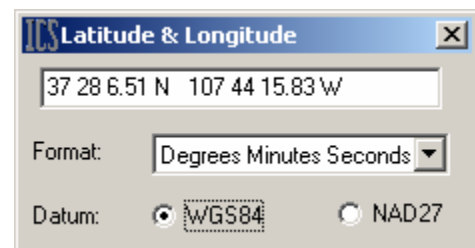
For example, to reassign all the features to a particular Zone, but keep the lower level assignments the same, check the Zone box, select a Zone from the dropdown list, un-check the remaining boxes, and click OK. Press the Cancel button to close the form without applying the settings.

Get Latitude/Longitude

Click this button to activate the tool, then click anywhere on the map display. A message box will pop up showing the latitude and longitude of the location. The coordinates will format according to the specified Incident properties dialog. The user can select a different coordinate format by selecting from the pull down list activated from the drop down arrow on the dialog.

The user can switch between NAD27 and WGS84 using the radio buttons on the form. (Please note that NAD83 and WGS84 are almost identical so NAD83 was omitted). The Latitude/Longitude values will automatically be converted between the selected datums.

Group 3.   Perimeter Tools

 <u>Create Fire Perimeter</u>

This command allows the user to create a new fire perimeter polygon by drawing it on the map. Users can activate the edit task by clicking this button, or by selecting the "**Create Perimeter Polygon**" task from the edit task list, and selecting the FirePolygon layer as the target.

The fire perimeter polygon can be created using any ArcMap edit sketch tool. When the polygon is complete, a pop-up form is displayed allowing the user to enter attributes for the new fire polygon feature. The standard attributes for fire perimeter polygons include the "Label" field, which is a general-purpose, optional field. The "Label" field can be used to store text or any other documentation. The form also includes pull down lists for the fields: "Fire_Class," "Burn_Code," and "Burn_Class."

Note: Fire Class is automatically calculated according to the referenced Magnetic Declination set for the Incident.

The "Fire Perimeter Attributes" form contains a button that allows the user to assign the perimeter to an organizational unit. These organizational units are set in the same manner as the "**Assign to Unit**" command documented in the Group 2 tools. The "Assign to" button is available whenever a fire perimeter, line or point feature is created. (See "<u>Assign to Unit</u>").

The "Fire Perimeter Attributes" form also contains a "Metadata" button that allows the user to enter feature-level metadata describing the source of the fire perimeter polygon feature and the date and time it was collected (See "Feature Level Metadata"). Both the unit assignment and the feature-level metadata are optional.

Every time a FirePolygon feature is created, a corresponding PerimeterSector feature is also created. The PerimeterSector lines are stored in the Incident PerimeterSector feature class. Line features are used to manage portions of the perimeter assigned to different operational units. The management of the lines contained in the PerimeterSector feature class is transparent to the user. The user should not perform any direct editing interaction with lines in the PerimeterSector feature class except splitting the lines into two or more pieces. In fact, the FIMT tools application is designed to prevent the user from changing the geometry of any assignment line associated with a perimeter polygon. The application also synchronizes the shape of the assignment line with changes to the shape of the perimeter polygon, so it remains coincident in spite of moving, modifying, or reshaping the perimeter polygon.

Copy to Perimeter Layer

This tool copies any polygons selected in other map layers into the FirePolygon layer. The user can copy perimeter boundaries from a shapefile or other feature source. The tool becomes enabled when the user is in an edit session and has at least one polygon feature selected. The tool will only copy polygon features.

Change Polygon Attributes

This command is used to modify the attributes ("Label," "Unit_ID," "Fire_Class," "Burn_Code," "Burn_Class," Assignment, or Metadata) for the currently selected perimeter polygon. The tool pops up the same form that is used to set the perimeter attributes, assignments, and metadata when a new fire perimeter polygon feature is created.

Split Assignment Line

If appropriate, this tool is used to split the fire polygon into units for assignment to Zone, Branch, Division, and/or Sector. The tool operates by drawing a line across an existing fire polygon using the "knife" icon. At the point the split line

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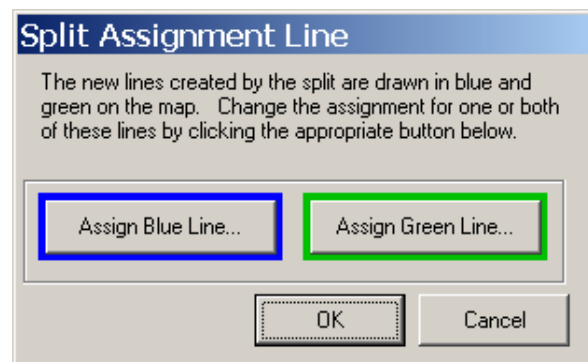
intersects the fire polygon, temporary **blue** and **green** PerimeterSector lines are drawn to indicate the location or side to receive the assignment attributes.

Once the assignments are made, and OK is clicked, the temporary graphics are removed. Once a split is completed the tool will automatically generate the appropriate AssignmentBreak symbology at the split.

Update Perimeter Assignment Breaks

This command runs as both a background process (monitoring changes to perimeter polygons, perimeter assignment lines, or perimeter assignment break points), and as an interactive process. When used interactively, the tool regenerates the AssignmentBreak feature class used to represent breaks in assignments of sections of a perimeter boundary.

Background process operations:
If a perimeter polygon moves or has its shape changed, the command resynchronizes the PerimeterSector feature class lines to keep them coincident with the FirePolygon feature(s), and regenerates the break points between perimeter assignments.

If a PerimeterSector line feature moves and is associated with a FirePolygon feature, the command restores the original geometry of the feature preventing the user from changing the coincidence between the PerimeterSector line and the FirePolygon feature.

If an AssignmentBreak point moves, the command restores the original geometry of the point preventing the user from moving the point off the perimeter boundary.

Interactive process operations:
The user may modify the assignments of the PerimeterSector lines associated with a FirePolygon feature by selecting and using the "Assign to Unit" command, by editing the attributes directly, or other means in ArcMap. When manual edits are performed, the AssignmentBreak points between unit assignments may no longer be accurate. When the button is clicked, ArcMap will re-evaluate the junctions between all PerimeterSector lines, merge any adjacent lines that have the same assignments, regenerate break points at the new line ends, and set the rotation angle of the points to match the orientation of the lines. "Floating Assignment Break" (see below) are not affected by this command.

Floating Assignment Break

> This tool will allow the user to create an AssignmentBreak other than on the perimeter of the fire. When this tool is selected, the user will be prompted to create a new feature in the AssigmentBreak feature class. Next, set the BreakType field to the desired assignment and the appropriate angle.

Create Island

> This tool is used to create island or (donut) polygons inside an existing fire polygon. The tool activates the FIMT Create Island edit task on the FirePolygon target feature class. No other ArcMap editing tool should be used to create island polygons. Due to the complexity of the relationships between FirePolygon, PerimeterSector, and AssignmentBreak feature classes, unpredictable behavior may be encountered.
>
> Once the Create Island tool is selected, any valid ArcMap drawing tool can be used to create the actual geometry of the island. This includes using the sketch tool or the trace tool.

Remove Island

> This tool is used to remove island polygons from an existing FirePolygon feature. This tool is the only method that should be used to remove or delete island polygons. Do not use any other ArcMap method. The tool operates by deleting all island geometry that is contained completely inside a temporary polygon drawn by the user. Draw a bounding polygon around the island to be removed.
>
> An error message will be displayed if the polygon is drawn outside the outer boundary of the FirePolygon feature or if the island polygon intersects the temporary polygon.

Convert Perimeter to Line

> This command converts the selected polygon(s) into a line and adds it to a desired line feature class. For example, a selected fire polygon may be converted into a FireLine feature. The command

Fire Perimeter To Line

This command will convert the selected fire perimeter polygon(s) into line features, and copy them into an editable line layer that you select.

Select the layer to receive the new line feature(s):

FireLine
PerimeterSector
Hist_Fireline
Hist_PerimeterSector

[OK]
[Cancel]
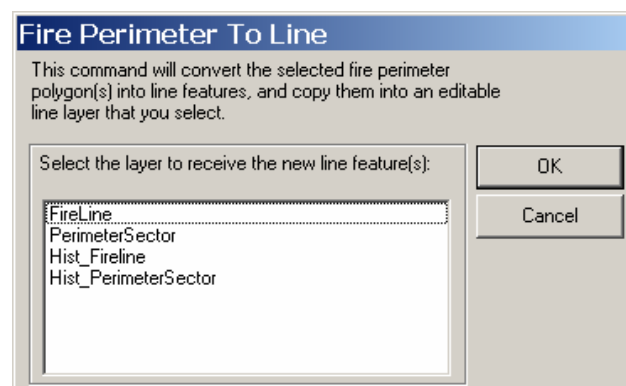
pops up a list of all line layers in the current map document and allows the user to select the target layer. The selected polygons are converted into polylines and posted to the selected target feature class.

Perimeter Report

This button produces a text report containing the area of the fire and the lengths assigned to the divisions and branches. This button is only enabled if Incident perimeter layers (FirePolygon and PerimeterSector) are present in the active data frame.
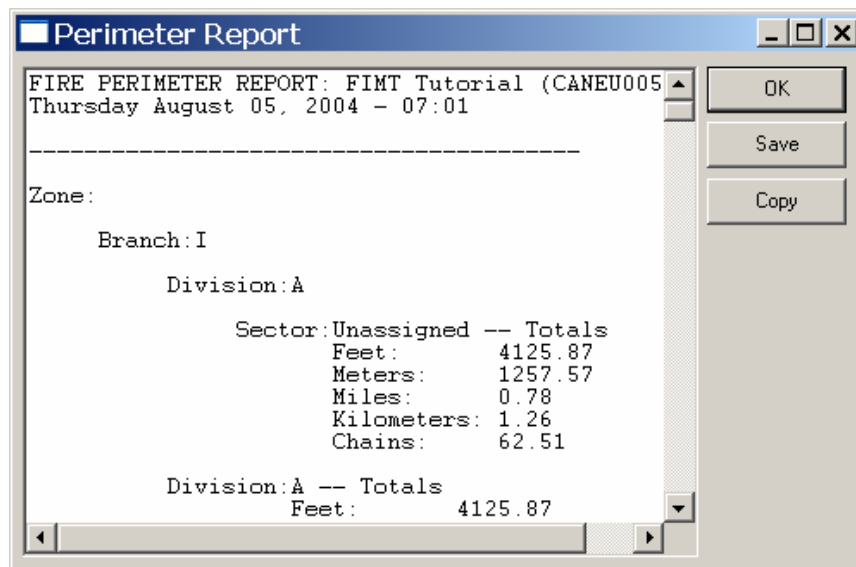
The Copy button on the Perimeter Report dialog is used to copy the text contents to the Windows clipboard. The text can then be pasted into other applications or into a map layout.

Perimeter Change Report

This button produces a text report that displays a list of area and amount of change by date for perimeter polygons stored in the Incident Hist_FirePolygon feature class. The report shows the change from each archived polygon to the next, making it easy to track the rate of fire progression. The report only looks at the features in the history layer, not the current perimeter layer. The report should be run after archiving the perimeter polygon. The following message will prompt the user to archive the current fire polygon before producing the report.

The Perimeter Change Report contains the Date, Time, Acres, Hectares and the amount of change in Acres and Hectares for the Hist_FirePolygon feature class.

```
ICS Report                                                                    _ □ X
PERIMETER CHANGE REPORT: Interlocken Fire (2003-21)                 ▲      OK
Friday January 30, 2004 - 14:17

------------------------------------------------------------------------         Save

   DATE      TIME      ACRES      HECTARES      CHANGE ACRES   CHANGE HECTARES     Copy

6/12/2003    2036    9871.89      3994.17          NA             NA
6/14/2003    2115    9895.67      4003.79         23.78           9.62
6/16/2003    1414   18136.50      7338.03       8240.83        3334.24            ▼
◄                                                                       ►
```
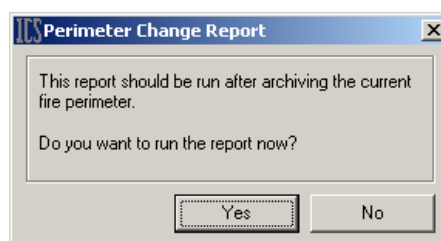
The Copy button on the History Report dialog is used to copy the text contents to the Windows clipboard. The text can then be pasted into other applications or into a map layout.
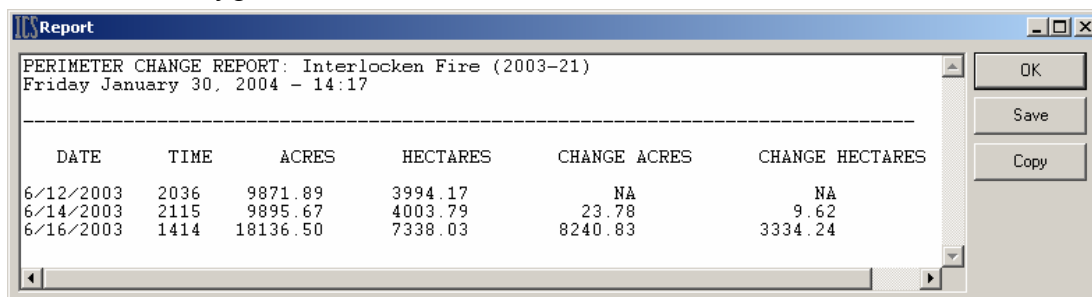
Draw History

This command draws the fire polygons from the Hist_FirePolygon layer in reverse order to show the progression of the fire on the map. The reverse order results in the larger most current fire perimeter polygons being drawn underneath the older smaller fire perimeter polygons. The button operates exclusively on the polygons from the fire perimeter history layer (Hist_FirePolygon feature class). The "**Copy Incident to History**" button should be used prior to drawing the history to insure the most current perimeter is included in the display.

Export FirePolygon to GeoDataBase

This tool will export all of the Incident FirePolygon features to a new personal geodatabase. This tool is used to share only the fire polygon(s). Once this new geodatabase is placed on the National Fire Interagency Coordination Center's ftp site, it will automatically be updated to GeoMac and available for public review. The dialog will prompt the user for the desired windows directory to place the new file. The NWCG GSTOP geodatabase naming standard is used. The tool will provide the user with the name of the file.
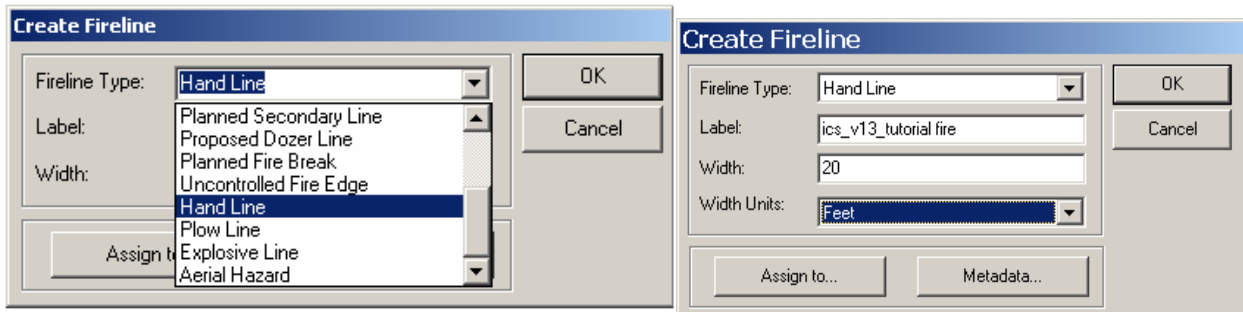
Group 4.   Fire Line Tools

FIMT ▼

Create Fire Lines

> This button activates the Create Fire Line edit task and sets the Target layer to FireLine. The user can complete the same steps using the standard ArcMap tools by selecting the edit Task and Target layer.
>
> With the Create Fire Line edit task selected, the user can create a new fire line using any of the standard ArcMap edit sketch tools (e.g. the sketch tool, the curve tool, or the trace tool). When the user completes the line by either double-clicking on its last point or by right-clicking on the map display and selecting Finish Sketch, the Create Fire Line task pops up a dialog used to set the fire line's type and other properties.

Create Fireline

Fireline Type: Hand Line
Label:
Width:

Planned Secondary Line
Proposed Dozer Line
Planned Fire Break
Uncontrolled Fire Edge
Hand Line
Plow Line
Explosive Line
Aerial Hazard

OK
Cancel

Assign t

Create Fireline

Fireline Type: Hand Line
Label: ics_v13_tutorial fire
Width: 20
Width Units: Feet

OK
Cancel

Assign to...   Metadata...

Copy to Fire Lines

> This button allows the user to copy selected line features from another layer into the FireLine layer. For example, a layer containing streams or roads. Select the features from the layer to be used as fire lines, and then click this button. The selected features will be added to the fire line layer and given a fire line type of Miscellaneous. The user will then use the "**Change Fire Line Type**" tool to set the lines to an appropriate type. Any attributes the imported lines have in common with the FireLine feature class will be copied. Lines copied from another Incident will retain their type and all other attributes.
>
> This control only copies line features. Any selected polygon or point features are ignored.

Change Fire Line

This control allows the user to change the fire line type. For example, if a proposed dozer line requires changing to a completed dozer line. The control is activated if the Incident database is being edited, the FireLine layer is present in the map display, and at least one fire line is selected.

Click on the button, and the Change Fireline dialog is displayed allowing the user to change the fire line type by choosing from the pull down list.
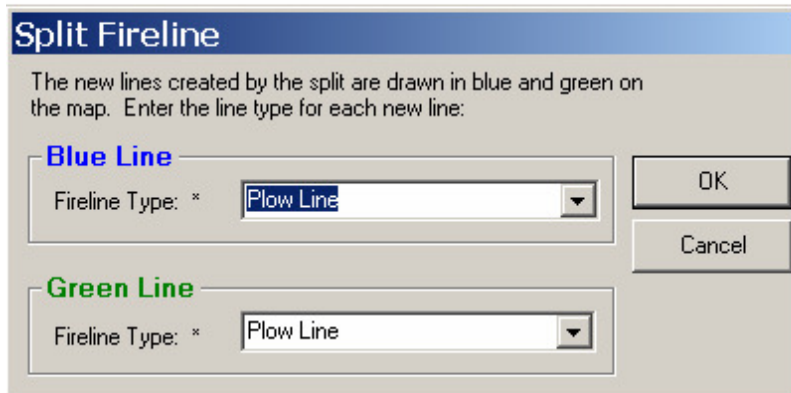
Split Fire Line

This tool allows the user to split a fire line into two separate lines. The user can then assign a different type to one or more of the new lines. To use the tool, the user needs to be editing the Incident geodatabase and the FireLines layer must be present in the map display. Users do not need to have any features selected. If a feature is selected, the selection display will be eliminated and the **blue** and **green** highlighting used to designate the two new fire lines will show.

This tool is activated by clicking on its icon and then using the tool to interact with the map display. When the tool is activated, the cursor icon turns into a knife. To split a fire line, click once on one side of the split point. Move the knife to the other side of the line, so the cut line crosses the fire line at the point of change. Click a second time. The picture below shows a line split in progress:

After the second click, the line will be split, and the two halves will be drawn in **blue** and **green**. A dialog will open to set the Fire Line types for the **Blue Line** and **Green Line** sections:
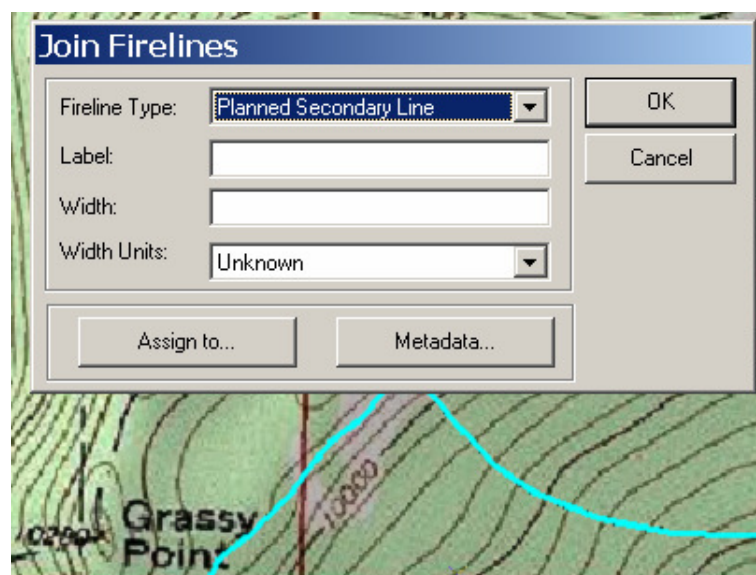
Join Fire Lines

This control takes two adjacent fire lines and merges them to create a single fire line. To activate the control, the database must be in an edit mode, the fire line layer must be present in the map, and have two fire lines selected.

When the tool is selected, the two fire lines will be joined into a single line, and a dialog will be displayed allowing the user to set the type on the single fire line.

Select the fire line type from the pull down list. Input the "Label" field value, and the line width if desired. Click OK to replace the two original fire lines with the new merged feature.

Fire Line Report

Click this button to get a brief report listing the lengths of various fire lines. This report can be saved to a file or copied and pasted into a text document. Below is an example of the fire line report.

```
Fireline Report: FIMT Tutorial (CANEU005113)
Thursday August 05, 2004 – 07:06

-----------------------------------

Uncontrolled Fire Edge
        98732.25 feet
        30093.59 meters
        18.70 miles
        30.09 kilometers
        1495.94 chains

Completed Dozer Line
        21509.86 feet
        6556.20 meters
        4.07 miles
        6.56 kilometers
        325.91 chains

Completed Line
```
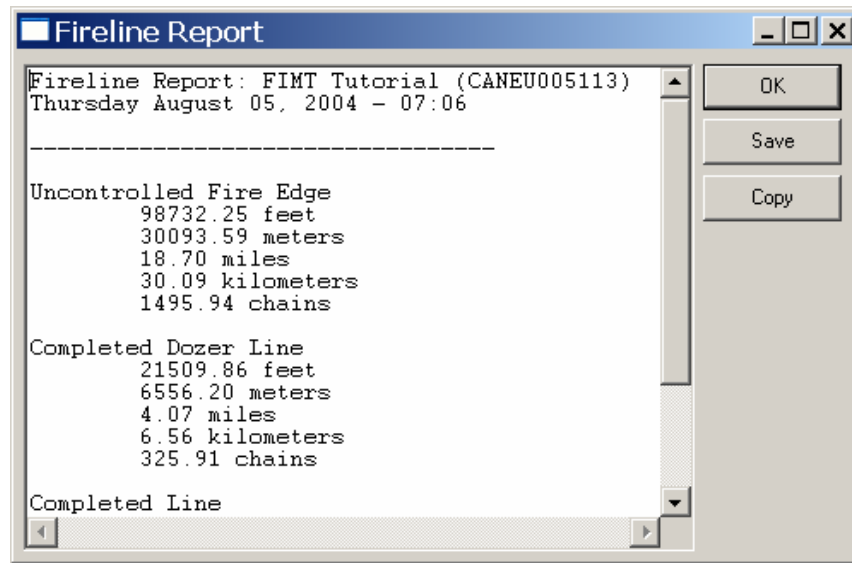
Group 5.   Fire Point Tools

 Create Fire Point

This button activates the Create New Fire Point edit Task and sets the Target layer to Fire Point with an "Unknown" type attribute. The user can do the same steps using the standard ArcMap user interface by selecting the edit Task and Target layer. This control is just a shortcut to simplify the process.

With the Create New Fire Point edit Task selected, the user can create a new fire point using any of the standard ArcMap edit sketch tools (e.g. the standard sketch or any other point input tool). When you enter the new point location, the "**Create New Fire Point**" tool will pop up the following dialog to allow the point's type and other properties to be set. Depending on the point type, the user may be asked for just a "Label" value and "Name" or for additional information, such as "Date," "Time," and "Direction."

Create Fire Point by Latitude/Longitude

This tool allows the user to create a new fire point by entering a latitude and longitude. When this button is clicked, an input dialog is displayed allowing the user to enter the coordinates of the point. Either positive/negative or coordinal values can be used (e.g. 38.63333 N   106.37417 W).

1. Use the radio buttons in the lower part of the dialog to specify the desired numeric format for the new point. The numeric format set for the Incident will be the default.
2. If the user overrides the default format, the change will only be temporary. This allows the user to make an entry using something other than the default format on a one-time basis.
3. Use the radio buttons in the Datum control panel to specify the datum of the input data.
4. Enter the latitude and longitude of the new point and click the OK button.

The tool will create the new point and display the fire point type dialog allowing the user to specify the point type and other information. This is the same dialog used to create a new point, as described in the **Create Fire Point** tool (see above).

Copy to Fire Points

This button allows the user to copy selected point features from another point layer into the FirePoint layer. For example, a layer of fire hydrants or other water sources could be imported into the FirePoint layer. Select the point features from the layer to be used as fire points and then click this button. The selected features will be added to the FirePoint layer and given a fire point type of Miscellaneous. The user can use the **Change Fire Point** control to set an appropriate type. Points copied from another Incident that have matching attributes will retain their original attribute values.

This control only copies point features. Any selected polygon or line features are ignored.

Move Fire Point to Latitude/Longitude

This control allows the user to move the selected fire point to a specific latitude and longitude. A point location that was originally estimated, may now be moved to an exact GPS location. The control is enabled when the Incident geodatabase is being edited, the FirePoint layer is present in the map, and one fire point is selected.

When the button is clicked, the control will display the latitude/longitude input dialog shown below. This is the same dialog used by the "**Create Fire Point by Latitude/Longitude**" tool that was described previously, except in this case, the current latitude and longitude of the fire point is displayed in the dialog. To update the location, simply type in a new latitude/longitude and click OK.

Latitude & Longitude Input

Enter the latitude and longitude; select the format in which you entered the coordinates; then select the datum your coordinates are based on.

Latitude:*   39 38 00
Longitude:*   -106 22 45

OK   Cancel

Coordinate Format
- ○ Decimal Degrees: +/-DD.DDDDD
- ○ Degrees Decimal Minutes: +/-DD MM.MM
- ● Degrees Minutes Seconds:+/- DD MM SS.S

Datum
- ● WGS84   ○ NAD27

    Change Fire Point

> This control lets the user change a fire point from one type to another.
> For example, use this tool to change a staging area into a camp. The
> control is enabled when the Incident database is being edited, the
> FirePoint layer is present in the map display, and one fire point is
> selected. Click this button, it displays the fire point type dialog. This is
> the same dialog used in the **Create New Fire Point**, as described
> previously.

    Create Fire Point Coordinate Table

> This control populates the FirePointCoordTable within the Incident
> geodatabase. There are several coordinate information columns on
> the FirePoints feature class attribute table, but is typically not enough
> for most users. This separate coordinate table allows the user to
> quickly decide the coordinate formats needed without having to deal
> with the remaining attributes.

The user can add the table to the ArcMap document and open up the table properties. Clicking on the Fields tab allows the user to see all of the available fields in the table. Checking the boxes at the beginning of the lines allows the user the option to display a column or not in the table. Once the table is opened, the user can decide the order of the columns by dragging a column to a new location.

The table can be placed on the layout by choosing the Options button on the bottom of the table dialog and selecting the "Add table to Layout" option.

Appendix II: FIMT 9.2.0.2 Quick Reference Guide

FIMT ▼

ArcGIS - FIMT Quick Reference Guide

INCIDENT TOOLS
— Create Incident
— Open Existing Incident
— Switch Incidents
— Edit Incident
— Incident Information
— Copy Incident to History
— Copy Incident Layers to Data
— Export Incident to Shape Files
— Auto-Update Measures
— Update Fire Names and Numbers

UTILITY
— Feature Level Metadata
— Change Incident Symbols
— Label Multiple Fields
— Assign to Unit
— Get Latitude/Longitude

POLYGON TOOLS
— Create FirePolygon
— Copy to FirePolygon Layer
— Change FirePolygon Attributes
— Split Assignment Line
— Update Perimeter Assignment
— Floating Assignment Break
— Create Island
— Remove Island
— Convert Perimeter to Line
— Perimeter Report
— Perimeter Change Report
— Draw History
— Export FirePolygon to Geodatabase

LINE TOOLS
— Create FireLine
— Copy to FireLine
— Change FireLine Attributes
— Split FireLine
— Join FireLine
— FireLine Report

POINT TOOLS
— Create FirePoint
— Create FirePoint by Lat/Lon
— Copy to FirePoint
— Move FirePoint to Lat/Lon
— Change FirePoint Attributes
— Populate FirePoint Coordinate Table

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Appendix III: Incident PGDB Data Mode

Geodatabase schema diagram

This diagram was auto-generated by the Geodatabase Diagrammer application sample and contains graphic elements that you can use to produce a data model diagram. This sample is available from the ArcScripts site on www.esri.com. You can find examples of finished data model diagrams at the data model section of arconline.esri.com.

Geodatabase   C:\Program Files\FIMT\FIMT9.2\FIMT_Template.mdb

Date generated   Wednesday, August 01, 2007

Feature Data Set - Incident

A	Annotation feature class **AnnoBreaks**
A	Annotation feature class **AnnoPoints**
· ·	Point feature class **AssignmentBreak**
┼	Line feature class **FireLine**
· ·	Point feature class **FirePoint**
▧	Polygon feature class **FirePolygon**
┼	Line feature class **PerimeterSector**

Feature Data Set - History

A	Annotation feature class **Hist_AnnoBreaks**
A	Annotation feature class **Hist_AnnoPoints**
· ·	Point feature class **Hist_AssignmentBreak**
┼	Line feature class **Hist_Fireline**
· ·	Point feature class **Hist_FirePoint**
▧	Polygon feature class **Hist_FirePolygon**
┼	Line feature class **Hist_PerimeterSector**

Incident Tables

▤	Table **FIMT_DeclinationSites**
▤	Table **FIMT_FieldNames**
▤	Table **FIMT_IncidentInfo**
▤	Table **FIMT_LayerInfo**
▤	Table **FIMT_PointInput**
▤	Table **FirePointCoordTable**

Fire Incident Mapping Tools Domains

These are the coded value domains that control the contents of various fields in the incident feature classes and application.

Valid values for fire lines

Coded value domain
FIMTFirelineType
Description *Valid values for the types of FireLine*
Field type *String*
Split policy *Duplicate*

Code	Description
0	Unknown
1	Uncontrolled Fire Edge
2	Completed Dozer Line
3	Completed Line
4	Escape Route
5	Fire Spread Prediction
6	Planned Fire Line
7	Planned Secondary Line
8	Proposed Dozer Line
9	Line Break Completed
10	Management Action Point
11	Proposed Burnout
12	Active Burnout
13	Aerial Foam Drop
14	Aerial Hazard
15	Aerial Ignition
16	Aerial Retardant Drop
17	Aerial Water Drop
18	Completed Burnout
19	Fire Break Planned or Incomplete
20	Ridge / Geographic Feature
21	Highlighted Manmade Feature
22	Heat Line (IRIN)
23	Hand Line
24	Explosive Line
25	Plow Line
26	Air Tanker Retardant
27	Air Tanker Foam
28	Helitanker Water
29	Helitanker Foam
99	Other
30	Maximum Manable Area

Valid values for Fire Point types

Coded value domain
FIMTFirepointType
Description *Valid values of Fire Points*
Field type *String*
Split policy *Duplicate*

Code	Description
0	Unknown
1	Fire Origin
2	Water Source
3	Drop Point
4	Camp
5	Spot Fire
6	Staging Area
7	Aerial Hazard
8	Safety Zone
9	Aerial Ignition
10	Lookout
11	Incident Base
12	Incident Command Post
13	Helibase
14	Helispot
15	Hot Spot
16	Retardant Pickup
17	Heat Source - Outside of Line
20	Mobil Weather Unit
22	IR Downlink
23	First Aid Station
24	MediVac Site
25	Fire Station
27	Airstrip or Airport
28	Repeater
29	Telephone
30	Fire Location
99	Other
21	Segment Break (Fire Use)
18	Heat Source - Inside of Heat Line (IRIN)
19	Retardant/Mud Pit
26	Wind Speed & Direction
31	Miscellaneous

Valid values for Unit Assignment Types

Coded value domain
FIMTAssignmentBreakTypes
Description *Valid Assignment*
Field type *Types*
Split policy *Long integer*

Code	Description
0	Zone
1	Branch
2	Division
3	Sector

Valid values for Fire Branch types

Coded value domain
FIMTBranches
Description *Valid values for Branch*
Field type *types*
Split policy *String*

Code	Description
0	Unassigned
1	I
2	II
3	III
4	IV
5	V
6	VI
7	VII
8	VIII
9	IX
10	X
11	XI
12	XII
13	XIII
14	XIV
15	XV
16	XVI
17	XVII
18	XVIII
19	XIX
20	XX

Valid values for Sector unit designations

Coded value domain
FIMTSectors
Description *Values of valid Sector designations*
Field type *String*
Split policy *Duplicate*

Code	Description
0	Unassigned
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20

Valid values for Division assignments

Coded value domain
FIMTDivisions
Description *Valid values for Divisions*
Field type *String*
Split policy *Duplicate*

Code	Description
0	Unassigned
1	A
2	B
3	C
4	D
5	E
6	F
7	G
8	H
9	I
10	J
11	K
12	L
13	M
14	N
15	O
16	P
17	Q
18	R
19	S
20	T
21	U
22	V
23	W
24	X
25	Y
26	Z
27	AA
28	AB
29	AC
30	AD
31	AE
32	AF
33	AG
34	AH
35	AI
36	AJ
37	AK
38	AL
39	AM
40	AN
41	AO
42	AP
43	AQ
44	AR
45	AS
46	AT
47	AU
48	AV
49	AW
50	AX
51	AY
52	AZ
53	BB
54	CC
55	DD
56	EE
57	FF
58	GG
59	HH
60	II
61	JJ
62	KK
63	LL
64	MM
65	NN
66	OO
67	PP
68	QQ
69	RR
70	SS
71	TT
72	UU
73	VV
74	WW
75	XX
76	YY
77	ZZ

Valid values for how intense was the burn

Coded value domain
FIMTBurnCode
Description *Values for how intense was the burn*
Field type *String*
Split policy *Duplicate*

Code	Description
0	Unknown
1	Burned Area
2	Partially Burned Area
3	Non-Burned Island
98	Not applicable
99	No interpretation

Valid values for Burn Classes

Coded value domain
FIMTBurnClass
Description *Valid values for burn classes*
Field type *String*
Split policy *Duplicate*

Code	Description
0	Unknown
1	Green Island < 1% burn
2	1% - 25% burned
3	26% - 50% burned
4	51% - 75% burned
5	76% - 94% burned
6	>94% burned
98	Not applicable
99	No interpretation

Valid values for complexity or size of fire

Coded value domain
FIMTFireClass
Description *Values for how big / complex was the fire*
Field type *String*
Split policy *Duplicate*

Code	Description
1	A: 0.0 to 0.25 acres
2	B: 0.26 to 9.9 acres
3	C: 10 to 99.9 acres
4	D: 100 to 299.9 acres
5	E: 300 to 999.9 acres
6	F: 1000 to 4999.9 acres
7	G: 5000+ acres
8	A: 0.01 to 0.1 hectares
9	B: 0.11 to 4.0 hectares
10	C: 4.1 to 40.0 hectares
11	D: 40.1 to 200.0 hectares
12	E: >200 hectares

Valid values for the source of the information

Coded value domain
FIMTDigitizedSource
Description *Values for the source of the information*
Field type *String*
Split policy *Duplicate*

Code	Description
0	Unknown
1	Hand sketch of any type
2	Non-corrected ground GPS
3	Non-corrected airborne GPS
4	Corrected ground GPS
5	Corrected airborne GPS
6	Digitized from aerial photo
7	Processed IR image
8	Processed scanned photo
9	Derived from satellite
10	Digitized from image
98	Not applicable
99	Digitized other

Valid values of Image type sources

Coded value domain
FIMTImageType
Description *Valid values for types of image sources*
Field type *String*
Split policy *Duplicate*

Code	Description
0	Unknown
1	Aerial Hand Drawn
2	IR Interpretation
3	IKONOS
4	LANDSAT
5	SPOT
6	Landsat Delta NBR
98	Not applicable
99	Other

Valid values for types of GPS equipment

Coded value domain
FIMTGPSType
Description *Valid types of GPS equipment*
Field type *String*
Split policy *Duplicate*

Code	Description
0	Unknown
1	Garmin III Plus
2	Garmin V
3	Garmin eTrex
4	Garmin Rino
5	PLGR GPS
6	Trimble GeoExplorer IMII
7	Trimble Pathfinder Pocket
8	Trimble ProXR
99	Other
98	Not applicable

Valid values for types of GPS processing

Coded value domain
FIMTGPSCorrection
Description *Valid values of GPS processing*
Field type *String*
Split policy *Duplicate*

Code	Description
0	Unknown
1	No Correction
3	Post Processing
99	Other
98	Not applicable
2	Real-time

Valid values for GPS travel methods

Coded value domain
FIMTGPSTravelMethod
Description *Valid values for GPS travel*
Field type *String*
Split policy *Duplicate*

Code	Description
0	Unknown
1	Helicopter
2	Fixed Wing
3	ATV
4	Foot
99	Other
98	Not applicable

Values for the source of information

Coded value domain
FIMTSourceMapScale
Description *Scale of the source information*
Field type *String*
Split policy *Duplicate*

Code	Description
0	Unknown
1	1:24,000
2	1:63,360
3	1:100,000
4	1:250,000
99	Other
98	Not applicable

Valid values for source information projection

Coded value domain
FIMTSourceProjection
Description *Source information projection*
Field type *String*
Split policy *Duplicate*

Code	Description
0	Unknown
1	Geographic
2	UTM
3	Alaska Albers
99	Other
98	Not applicable

Valid values for source information datum

Coded value domain
FIMTSourceDatum
Description *Input source*
Field type *String*
Split policy *Duplicate*

Code	Description
0	Unknown
1	WGS84
2	NAD27
3	NAD83
99	Other
98	Not applicable

Valid values for source information units

Coded value domain
FIMTSourceUnits
Description *Source information units of*
Field type *measure*
Split policy *String*

Code	Description
0	Unknown
1	Decimal Degrees
2	Meters
3	Feet
99	Other
98	Not applicable

Valid values for line width units of measure

Coded value domain
FIMTLineWidthUnits
Description *Valid line with units of measure*
Field type *String*
Split policy *Duplicate*

Code	Description
0	Unknown
1	Feet
2	Meters
98	Not applicable

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